

REMARKS

Applicants have carefully reviewed this Application in light of the Office Action mailed April 23, 2004 (Paper No. 10). Claims 7 and 27-32 were previously cancelled without prejudice or disclaimer. Claim 33 was added in the Request for Continued Examination and Amendment filed January 7, 2004; however, it appears that Claim 33 was not examined in the Office Action. Applicants have added Claims 34-37 and respectfully submit that the claims are supported by the specification and add no new matter. Claims 1-6, 8-26 and 33-37 are now pending in this Application. Claims 1-6 and 8-26 stand rejected under 35 U.S.C. §103. Applicants have amended Claims 1, 3, 17 and 33 to further define various features of Applicants' invention. Applicants respectfully request reconsideration and favorable action in this case.

Rejection under 35 U.S.C. § 103

Claims 1 and 10-12 stand rejected under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent 6,335,240 issued to Yeong-kwan Kim et al. ("*Kim*"), and in view of U.S. Patent No. 5,930,046 issued to Scott Eugene Solberg et al. ("*Solberg*").

Claims 2-9, 13-14, and 16-26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Kim* and *Solberg* as applied to Claim 1 above, and further in view of U.S. Patent Publication No. US 2002/0106846 filed by Sean M. Seutter et al. ("*Seutter*").

Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Kim*, *Solberg* and *Seutter* as applied to the claims above, and further in view of U.S. Patent No. 5,616,177 issued to Norihide Yamada ("*Yamada*").

Claims 1-6, 8-26 and 33 are Allowable

Claim 1, as amended, recites:

A method of fabricating a conformal film on a substrate, the method comprising:

heating the substrate to a temperature sufficiently low so that precursor adsorbed on the substrate is not thermally dissociated;

depositing a film of predetermined thickness on the substrate by performing a predetermined number of atomic layer deposition cycles in a

processing chamber, each atomic layer deposition cycle comprising:
dosing the substrate with a precursor to establish a monolayer of the precursor on the substrate; and
dosing the substrate with a reactant to deposit an atomic layer deposition film;
wherein the film, as deposited, generally has a tensile intrinsic stress; and
annealing the substrate and film after a predetermined number of atomic layer deposition cycles to change the intrinsic stress in the film from tensile to compressive.

None of the cited references discloses, teaches, or suggests each and every one of these limitations, whether the cited references are considered alone or in combination. For example, none of the cited references discloses “wherein the film, as deposited, generally has a tensile intrinsic stress; and annealing the substrate and film after a predetermined number of atomic layer deposition cycles to change the intrinsic stress in the film from tensile to compressive,” as specifically recited in amended Claim 1.

Kim, Seutter, and Yamada each fail to disclose anything regarding stresses in a film, much less annealing a deposited film to change the intrinsic stress in the film from tensile to compressive.

Solberg discloses post-deposition annealing of layers of high refractive index material (such as zirconia or titania) in order to achieve a tensile stress in the layers. For example, *Solberg* discloses that “[a] common technique to densify and stabilize zirconia and titania thin film layers involves a post-deposition annealing process. Annealing results in volume shrinkage of the thin film layers Because the thin film layers are constrained by the substrate, which does not shrink, this volume shrinkage results in the development of tensile stress within the film layers.” (Col. 6, lines 53-65) (emphasis added). As another example, *Solberg* discloses that “[i]t is a feature of the present invention to control the microstructure of the post-deposition layers of high refractive index material to thereby achieve a desired tensile stress during a post-deposition annealing process.” (Col. 8, lines 45-48). Thus, *Solberg* fails to disclose, teach or suggest - and in fact, teaches directly away from - annealing a substrate and film “to change the intrinsic stress in the film from tensile to compressive,” as specifically recited in amended Claim 1.

Thus, for at least the reasons discussed above, none of the cited references, whether considered alone or in combination, discloses, teaches or suggests the combination of limitations recited in amended Claim 1. Therefore, Applicants respectfully request reconsideration and allowance of amended Claim 1, together with Claims 2-6 and 8-16 that depend from Claim 1. In addition, for at least the reasons stated with regard to amended Claim 1, Applicants respectfully request reconsideration and allowance of amended independent Claim 17, together with Claims 18-26 and 33 that depend from Claim 17.

New Claims 34-37 are Allowable

In addition to depending from amended independent Claims 1 and 17 shown to be allowable above, new Claims 34-37 are allowable over the cited references at least because they recite addition limitations that are not disclosed, taught or suggested by the cited references.

For example, new Claim 34 recites, in part, "wherein annealing the substrate and film comprises one or more anneals that provide the deposited film with a breakdown voltage of at least 9 MV/cm." New Claim 36 recites similar limitations. None of the cited references, whether considered alone or in combination, discloses, teaches, or suggests these limitations.

As another example, new Claim 35 recites, in part, "wherein annealing the substrate and film comprises one or more plasma anneals, which plasma anneals provide the deposited film with a breakdown voltage of at least 10 MV/cm." New Claim 37 recites similar limitations. None of the cited references, whether considered alone or in combination, discloses, teaches, or suggests these limitations.

For at least these reasons, Applicants respectfully request consideration of allowance of new Claim 34-37.

CONCLUSION


Applicants appreciate the Examiner's careful review of the application. Applicants have now made an earnest effort to place this case in condition for allowance in light of the amendments and remarks set forth above. For the foregoing reasons, Applicants respectfully request reconsideration of the rejections and full allowance of Claims 1-6, 8-26 and 33, as amended and new Claims 34-37.

Applicants believe no fees are due at this time, however, the Commissioner is hereby authorized to charge any fees to Deposit Account No. 50-2148 of Baker Botts L.L.P.

If there are any matters concerning this Application that may be cleared up in a telephone conversation, please contact Applicants' attorney at 512.322.2581.

Respectfully submitted,

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